THURSDAY, MAY 1, 1913.

THE CARBONISATION OF COAL.

The Carbonisation of Coal. A Scientific Review of the Formation, Composition and Destructive Distillation of Coal for Gas, Coke and By-Products. By Prof. V. B. Lewes. Pp. xiv + 315. (London: John Allan and Co., 1912.) Price 7*s.* 6*d.* net.

THIS book is a welcome addition to the literature of a subject which is increasing in importance with each successive decade. Practical men are at length beginning to realise that the utilisation of the store of potential energy in coal by more rational methods than have hitherto prevailed is a problem that has to be grappled with seriously if our supremacy in the chief manufactured products of the world is to be maintained Authorities of the highest competence have repeatedly pointed out that enormous economies might be effected if more scientific—that is, more common-sense—methods were employed in the consumption of coal. The waste is universal and extends practically to every industry, although in some to a much greater extent than in others. In the blast furnaces it is relatively small, for the reason that ever since the introduction of the hot-blast, the connection between potential energy and output has received an amount of consideration such as has not been bestowed upon any other aspect of the general problem. On railways, in factories, in brickworks, potteries and glassworks the waste is simply appalling.

It has been calculated that our annual consumption of coal is from 143 to 168 million tons per annum, of which from 30 to 36 million tons are used for domestic purposes. Of this huge amount it is estimated that from 40 to 60 million tons are practically wasted; that is, this quantity could be saved if gas-generating plant, electric motor and traction, gas heating and gas cooking, briquettes and coke were more generally employed than they are at present.

We think, therefore, that Prof. Lewes has been amply justified in putting together and in enlarging his Cantor lectures on the carbonisation of coal, given to the Society of Arts in 1911, and we trust that his appeal to a wider public will meet with the success it undoubtedly merits. The subject, indeed, is admittedly of national importance, but the fear is that this country will only waken up to the full significance of that fact when the pinch of necessity has tightened to a real grip—so tight, indeed, that it will be too late to shake it off.

The purpose of this work is to point out how the methods known comprehensively as "carbonisation processes"—that is, processes involving the preliminary treatment of coal by heating it under such conditions that initial products are formed capable of being turned to economical account as sources of power—may tend to minimise this waste. To understand fully the *rationale* of the effect of heat upon coal implies some knowledge of the proximate nature of coal and of the essential differences in composition between one coal and another. On this matter knowledge is confessedly very imperfect, but at the same time a certain amount of information has been gained by the study of the action of various solvents upon coal and by an examination of the nature of the products so obtained, as well as of the changes which the coal has experienced by the treatment. Incidentally, Prof. Lewes has been led to speak of the influence of storage, *i.e.* oxidation, on the nature of coal, and its effect on its coking properties and on the products of its destructive distillation. He is naturally induced to treat of the causes of the spontaneous ignition of coal, and he points out that the phenomenon is certainly more complicated than is generally supposed, and is not wholly, or in all cases, due to the occurrence of "brasses," or any readily oxidisable form of finely divided iron sulphide, but is connected with the character of its proximate constituents.

A special chapter is devoted to the question of the classification of the various kinds of coal. Strictly speaking, the most rational method would be one dependent upon proximate composition, and perhaps in time to come we may arrive at such a system. At present our knowledge on this matter is far too partial and imperfect to warrant even the attempt, and accordingly we have to content ourselves with the admittedly empirical and irrational systems which the metallurgists have devised for us. Of course, in practice, the systems we owe to Fleck, Gruner, Seyler and others—mainly German and Austrian writers—have a certain measure of convenience, and are probably remotely based upon intrinsic differences of chemical nature, but the correlation has not been definitely traced, and is certainly not capable of being stated with precision.

The greater part of the rest of the work is concerned with the effect of heat upon coal, or, to speak more precisely, on its behaviour during the process of destructive distillation. Of course, this is a very wide subject, and has been treated at great length in many standard treatises. It has, however, not been Prof. Lewes's object to traverse well-trodden ground. His purpose has been rather to direct attention to novel points, or to offer his testimony on disputed matters. This

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feature of the work will commend it to the attention of those who are concerned practically with the carbonisation of coal, whether in gas manufacture, coke-oven work or tar distillation. They may not always agree with Prof. Lewes, but it will be admitted that he speaks as a well-trained chemist with the experience of a generation on practically every aspect of the subject, and that his opinions are fairly and temperately stated, such as becomes a man of science whose sole object is to elucidate the facts.

A commendable feature of the book is the excellence of the illustrations. Many of them are novel and all are of the character that experts will appreciate.

T. E. Thorpe.

THE TRAINING OF GOLDSMITHS.

Metalwork and Enamelling: a Practical Treatise on Gold- and Silver-smiths' Work and their Allied Crafts. By Herbert Maryon. Pp. xiii + 327 + plates. (London: Chapman and Hall, Ltd., 1912.) Price 7*s.* 6*d.* net.

THE abolition of the apprenticeship system of training and the establishment of technical institutions for the education of young goldsmiths and silversmiths have created a demand for text-books which have in view the wants both of technical students and of those who are already practically engaged in these crafts.

The modern practice whereby the worker in the precious metals confines himself to a single branch of the craft results in technical skilfulness and in cheapness of production, but its influence is definitely against the production of craftsmen who are masters of their art. There will, however, always be a demand, and we hope an increasing demand, for work executed throughout by one man—a man who can both design and carry the work through—and text-books which will assist in the production of such men are rendering great service to the ancient craft of precious metal working. The information must be given in a form not too academic, and expressed in language that the worker of ordinary intelligence can understand.

This book is an important addition to this class of technical literature, and will be of value not only to the student but to those already engaged in gold- and silver-smiths' work. It deals with metalwork and enamelling from the essentially practical and technical rather than from the artistic or historical point of view. The author has departed from the course adopted by most writers on the subject, which consists in describing in detail the making of single articles, such as a brooch, cup, or casket.

The operations of soldering, raising, stone-setting, enamelling, &c., are fully discussed in a clear and concise manner, and the descriptions are accompanied by good illustrations.

Two chapters are devoted to a description of the materials and tools used, and to the making of small tools required for special work. The sharpening, hardening, and tempering of tools, which are matters of considerable importance to the craftsman, have also been dealt with. Designing, which is the essential basis of the gold- and silver-smiths' art, is ably discussed, and the method of teaching design adopted by Mr. Catterson Smith, at the Birmingham Municipal School of Art, for training lads who propose to enter the jewellery and metal trades is described and well illustrated.

Twenty-three plates illustrative of some of the finest examples of Greek, Etruscan, Renaissance, Celtic, and modern gold- and silver-smiths' work are given. These are taken from masterpieces exhibited in the British Museum and the Victoria and Albert Museum, and the publishers are to be highly congratulated on the excellent way in which these have been reproduced. The plates, which are fully described, will be of considerable assistance to students in studying the numerous styles of ornamentation, &c. A short chapter on the life and work of Benvenuto Cellini is appended.

A bibliography is given, but several important modern works have been omitted.

Ernest A. Smith.

GAS, OIL AND PETROL ENGINES.

The Gas, Petrol and Oil Engine. Vol. ii.: The Gas, Petrol and Oil Engine in Practice. By Dr. Dugald Clerk, F.R.S., and G. A. Burls. New and revised edition. Pp. viii + 838. (London: Longmans, Green and Co., 1913.) Price 25*s.* net.

THE first volume of this book, which we reviewed some three years ago (November 11, 1909), was devoted chiefly to thermodynamics. Dr. Dugald Clerk, with the help of Mr. Burls, has now issued the companion volume treating of the gas, petrol and oil engine in practice. The current volume is much bulkier than its predecessor, and is one calling more for the skill of an editor in its composition than for that of an author. "Practice" with gas, oil and petrol engines now covers such a ramification of diverse uses that it is exceedingly difficult to write any treatise on the subject which shall show at the same time breadth of knowledge and unity of conception; and it is characteristic of Dr. Clerk's writings that the former is always the more pronounced.

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